

Application Serial No. 09/511,986

REMARKS

The final Office Action, which was mailed on January 7, 2002, has been received and reviewed. Claims 47-68 and 75-90 are currently pending in the application. Claims 47-68 and 75-90 each stand rejected.

It is proposed that claims 49 and 57 be canceled without prejudice or disclaimer.

It is also proposed that claims 47, 48, 52, and 56 be amended.

Reconsideration of the above-referenced application is respectfully requested.

Information Disclosure Statement

Please note that an Information Disclosure Statement was filed in the above-referenced application on January 11, 2002, but that an initialed copy of the PTO-1449 that accompanied the Information Disclosure Statement has not yet been returned to the undersigned attorney. It is respectfully requested that the information cited on the PTO-1449 be considered by the Office and made of record in the above-referenced application, and that an initialed copy of the PTO-1449 evidencing such consideration be returned to the undersigned attorney.

Drawings

The drawings were objected to under 37 C.F.R. § 1.83(a) for not illustrating a dielectric layer on an active surface of a semiconductor die, as described in the specification. It is respectfully submitted that the drawings already illustrate such a dielectric layer. For example, FIGs. 8 and 9 both depict a semiconductor device 10 with a dielectric layer 42 on an active surface thereof. Accordingly, withdrawal of the objection to the drawings is respectfully requested.

Rejections Under 35 U.S.C. § 103(a)

M.P.E.P. 706.02(j) sets forth the standard for a Section 103(a) rejection:

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the

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art, to modify the reference or combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). (Emphasis added).

Kepchar

Claims 47-68 and 75-90 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent 4,138,672 to Kepchar (hereinafter "Kepchar").

Kepchar teaches a light-emitting diode (LED) type display element. The LED display element of Kepchar, as shown in an inverted orientation in FIG. 2 thereof, includes a package, or block 28, with a number of light pipes 30, each of which corresponds to an element of an LED character (*e.g.*, the numeric LED character "8", the elements of which may be selectively illuminated to display any digit from 0 to 9). As depicted in FIG. 1 of Kepchar, an LED 18 underlies each light pipe 30. The LED 18 of each element of an LED character is supported by an elastomeric, electrically conductive pad 20, which in turn rests upon a land 12, or terminal, of a circuit board 10 that underlies the components of each of the elements of the LED character and, thus, the entire LED display element that corresponds to that LED character. Thus, the land 12 that underlies LED 18 comprises a first electrode for selectively activating that LED 18. The second electrode that is required for selectively activating the LED 18 comprises a conductive coating 26 on a transparent plate 24, which communicates with another, corresponding land 14, or terminal, of the circuit board 10 by way of another elastomeric, electrically conductive pad 22, which pad 22 is positioned between the conductive coating 26 and its corresponding land 14.

Upon being activated by the flow of an electrical current through lands 12 and 14 of the circuit board 10, the LED 18 is illuminated. The light from LED 18 passes through conductive coating 26 of the transparent plate 24 and into the transparent plate 24. The light is collected from the transparent plate 24 by a corresponding light pipe 30, which conveys the light through the block 28, which is opaque, to a desired location on the other side of the block 28.

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Claims 47, 48, 50, and 51 are drawn to conductive traces that comprise a plurality of superimposed, contiguous, mutually adhered layers, each of which comprises conductive polymer. Claims 52-56 and 58-63 are drawn to a semiconductor device that includes, among other things, at least one conductive trace that includes a plurality of superimposed, contiguous, mutually adhered layers, each of which comprises conductive polymer.

Claims 64-68 are directed to semiconductor device assemblies that include a plurality of conductive elements, each of which extends between a contact of a carrier and a corresponding bond pad of a semiconductor die and includes a plurality of superimposed, contiguous, mutually adhered layers comprising conductive material. Each of claims 75-90 recites a semiconductor device assembly that includes, among other things, at least one conductive element connecting at least one contact pad of a first semiconductor device component and at least one contact pad of a second semiconductor device component. Each such conductive element includes a plurality of superimposed, contiguous, mutually adhered layers comprising conductive material.

It is respectfully submitted that no *prima facie* case exists as to the obviousness of any of claims 47, 48, 50-56, 58-68, and 75-90 over Kepchar for at least two reasons.

First, it is respectfully submitted that one of ordinary skill in the art would not have been motivated to have modified the teachings of Kepchar in the manner that has been asserted in the outstanding Office Action. The conductive coating 26 of Kepchar does not comprise a conductive polymer. While the elastomeric pad 22 that establishes electrical communication between the conductive coating 26 and its corresponding land 14 does comprise a conductive polymer, the elastomeric pad 22 is not a part of the conductive coating 26 but, rather, a separate, discrete element that is merely intended to be positioned between the conductive coating 26 on the transparent plate 24 and the circuit board 10. Moreover, Kepchar does not teach or suggest that the elastomeric pad 22 includes a plurality of layers.

Furthermore, the Office has not provided any reasoning for the asserted modification of Kepchar.

Accordingly, it is respectfully submitted that one of ordinary skill in the art would not have been motivated to have modified the teachings of Kepchar in such a way as to render

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obvious a circuit trace that includes a plurality of superimposed, contiguous, mutually adhered layers, each of which comprises conductive polymer, a semiconductor device including such a circuit trace, or a semiconductor device assembly that includes a conductive element that extends between two contacts (e.g., contact pads, bond pads, etc.).

Second, it is respectfully submitted that Kepchar does not teach or suggest each and every element of any of claims 47, 48, 50-56, 58-68, or 75-90.

Independent claim 47, as proposed to be amended, recites a conductive trace that is at least partially formed on at least one semiconductor device component and that comprises a plurality of superimposed, contiguous, mutually adhered layers of conductive polymer.

Kepchar does not teach or suggest a conductive trace that is at least partially formed on a semiconductor device component and that includes a plurality of superimposed, contiguous, mutually adhered layers of conductive polymer. Instead, the conductive coating 26 described in Kepchar appears to include a single layer of metal and is formed on a transparent plate 24. The elastomeric pad 22 of Kepchar, which is a separate element from the conductive coating 26, is formed from a conductive elastomer, but Kepchar does not teach or suggest that the elastomeric pad 22 may include a plurality of layers.

Accordingly, it is respectfully submitted that Kepchar does not teach or suggest each and every element of independent claim 47, as proposed to be amended, as is required to maintain a rejection under 35 U.S.C. § 103(a).

In view of the foregoing, it is respectfully submitted that a *prima facie* case as to the obviousness of independent claim 47, as proposed to be amended, has not been established under 35 U.S.C. § 103(a).

It is proposed that claim 49 be canceled without prejudice or disclaimer, rendering the rejection thereof moot.

Each of claims 48, 50, and 51 is allowable, among other reasons, as depending from claim 47, which is allowable.

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Claim 48 is further allowable since Kepchar lacks any teaching or suggestion of a conductive trace that includes a plurality of layers that comprise a thermoplastic conductive elastomer.

Claim 51 is also allowable because Kepchar lacks any teaching or suggestion of a conductive trace that is configured to at least partially connect two semiconductor device components. Rather, the circuit board 10 and LED 18 of Kepchar are electrically connected by an elastomeric pad 20, while the light pipe 30-carrying structure and the circuit board 10 are electrically connected by way of another elastomeric 22.

Independent claim 52, as proposed to be amended, recites a semiconductor device that includes a semiconductor device component and at least one conductive trace carried by the semiconductor device component. The at least one conductive trace of amended claim 52 includes a plurality of superimposed, contiguous, mutually adhered layers comprising conductive polymer.

In contrast to amended claim 52, Kepchar lacks any teaching or suggestion of a semiconductor device component that carries at least one conductive trace that includes a plurality of superimposed, contiguous, mutually adhered layers that comprise conductive polymer. Instead, the conductive coating 26 of Kepchar is formed from metal, while the elastomeric pad 22 of Kepchar, which is a discrete element from the conductive coating 26, may be formed from a conductive elastomer. Kepchar does not teach or suggest that the elastomeric pad 22 may include a plurality of layers.

Accordingly, it is respectfully submitted that Kepchar does not teach or suggest each and every element of amended independent claim 52, as is required to maintain a rejection under 35 U.S.C. § 103(a).

It is proposed that claim 57 be canceled without prejudice or disclaimer, mooted the rejection thereof.

Each of claims 53-56 and 58-63 is allowable, among other reasons, as depending either directly or indirectly from claim 52, which is allowable.

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Claim 55 is additionally allowable because Kepchar does not teach or suggest that a dielectric layer on an active surface of a semiconductor die may carry at least one conductive trace including plurality of superimposed, contiguous, mutually adhered layers.

Claim 56 is further allowable since Kepchar lacks any teaching or suggestion of a semiconductor device including at least one conductive trace with a plurality of layers that comprise a thermoplastic conductive elastomer.

Claim 60 is also allowable because Kepchar does not teach or suggest that a conductive trace that has the features recited in claim 52 may be carried by a semiconductor die.

Claim 62 is additionally allowable since Kepchar does not teach or suggest that a conductive trace with the features recited in claim 52 may be carried by a semiconductor device component that comprises leads.

Claim 63, which depends from claim 62, is further allowable because Kepchar lacks any teaching or suggestion of a conductive trace that may contact a lead of a semiconductor device component.

Independent claim 64 recites a semiconductor device assembly that includes a carrier, at least one semiconductor die adjacent to the carrier, and conductive elements that electrically connect contacts of the carrier to corresponding bond pads. Independent claim 64 also recites that each of the conductive elements includes a plurality of superimposed, contiguous, mutually adhered layers comprising conductive material.

It is respectfully submitted that Kepchar does not teach or suggest a semiconductor device assembly of the type recited in claim 64. In particular, the assembly of Kepchar does not include a semiconductor die. Instead, it includes an LED 18. As the assembly of Kepchar does not include a semiconductor die, it also lacks conductive elements that electrically connect bond pads of a semiconductor die to corresponding contacts of the circuit board thereof, as are required by independent claim 64. Moreover, Kepchar lacks any teaching or suggestion that such conductive elements may include a plurality of superimposed, contiguous, mutually adhered layers.

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It is, therefore, respectfully submitted that Kepchar does not teach or suggest each and every element of independent claim 64, as is required to maintain a rejection under 35 U.S.C. § 103(a).

Each of claims 65-68 is allowable, among other reasons, as depending from claim 64, which is allowable.

Claim 66 is further allowable since Kepchar neither teaches nor suggests an assembly that includes a carrier that comprises leads.

Claim 67 is additionally allowable because Kepchar does not teach or suggest conductive elements that may be formed from a plurality of layers that comprise a thermoplastic conductive elastomer.

Claim 68 is further allowable since Kepchar lacks any teaching or suggestion of conductive elements that include a plurality of layers that comprise a metal.

Independent claim 75 recites a semiconductor device assembly that includes a first semiconductor device component, a second semiconductor device component, and at least one conductive element connecting at least one contact pad of the first semiconductor device component to at least one contact pad of the second semiconductor device component. In addition, independent claim 75 recites that the at least one conductive element comprises a plurality of superimposed, contiguous, mutually adhered layers.

By way of contrast, Kepchar includes no teaching or suggestion of an assembly that includes a conductive element with a plurality of superimposed, contiguous, mutually adhered layers that connects contact pads of two semiconductor device components. In particular, Kepchar does not teach or suggest that the elastomeric pad 20 which electrically connects land 12 of the circuit board to the overlying LED 18 includes a plurality of layers. Nor does Kepchar teach or suggest that elastomeric pad 22, which electrically connects land 14 of the circuit board 10 to the conductive coating 26 on the transparent plate 24 includes a plurality of layers. Kepchar also fails to teach or suggest that the conductive coating 26 includes a plurality of layers. Further, Kepchar lacks any teaching or suggestion that elastomeric pad 20, elastomeric pad 22, or conductive coating 26 connects a least one contact pad of a first semiconductor device

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component to at least one contact pad of a second semiconductor device component. Kepchar does not even teach or suggest that the LED 18 thereof includes a contact pad. Rather, it appears from the disclosure of Kepchar that electrical contact may be made with any portion of both surfaces of the LED 18 to render the LED 18 operable.

Therefore, it is respectfully submitted that Kepchar neither teaches nor suggests each and every element of independent claim 75, as is required to maintain a rejection under 35 U.S.C. § 103(a).

Each of claims 76-90 is allowable, among other reasons, as depending either directly or indirectly from claim 75, which is allowable.

Claim 76 is further allowable since Kepchar does not teach or suggest a conductive element that includes a plurality of layers that comprise a conductive elastomer.

Claim 77 is also allowable since Kepchar lacks any teaching or suggestion of a conductive element that includes a plurality of layers that comprise a metal.

Claim 79 is further allowable since Kepchar does not teach or suggest that any of the circuit board 10, LED 18, or the light pipe 30-carrying structure thereof is a packaged semiconductor die.

Claim 80 is additionally allowable since Kepchar includes no teaching or suggestion of an assembly of which both the first and second semiconductor devices comprise at least one semiconductor die. It is respectfully submitted that neither the circuit board 10 nor the light pipe 30-carrying structure of Kepchar comprises a semiconductor die.

Claim 85 is further allowable because Kepchar lacks any teaching or suggestion of a conductive element that extends across a peripheral edge of at least one of a first semiconductor device component and a second semiconductor device component.

Claim 86, which depends from claim 80, is further allowable since Kepchar does not teach or suggest an assembly that includes a carrier substrate upon which at least one of the at least two semiconductor dice is disposed.

Claim 87, which depends from claim 86, is also allowable since Kepchar includes no teaching or suggestion of an assembly that includes at least one other conductive element that

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connects another contact pad of one of the at least two semiconductor dice to a contact pad of the carrier substrate.

Claim 88 depends from claim 87 and further recites that the at least one other conductive element includes a plurality of superimposed, contiguous, mutually adhered layers comprising conductive material, elements which are neither taught nor suggested by Kepchar.

Claim 89, which depends from claim 88, is additionally allowable since Kepchar does not teach or suggest a multi-layered conductive element having layers that are formed from a conductive elastomer.

Claim 90, which depends from claim 88, is additionally allowable because Kepchar does not teach or suggest a conductive structure that includes a plurality of contiguous layers that comprise a metal.

In view of the foregoing, it is respectfully submitted that Kepchar does not render obvious any of claims 47, 48, 50-56, 58-68, or 75-90 of the above-referenced application under 35 U.S.C. § 103(a). Accordingly, it is respectfully requested that the section 103(a) rejection of each of these claims be withdrawn.

Hata

Claims 47-68 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent 4,891,635 to Hata (hereinafter "Hata").

Hata teaches an electrostatic display element. The electrostatic display element of Hata includes two spaced apart electrodes 1 and 2 having interior surfaces that face one another and which are lined with insulative layers 15 and 25 that have different colors from each other. A flexible, central electrode 3 is positioned between the first and second electrodes 1 and 2 and includes a flexible, thin dielectric film 31 which has surfaces that are coated with conductive layers 32 and 33. It is clear from FIGs. 1 and 3(b) of Hata that the central electrode 3 is a planar member. The central electrode may be secured in place by two contact plates (*e.g.*, plates 52 and 53) that are biased together with screws rather than adhered to one another.

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It is respectfully submitted that there are at least two reasons the Office has not established a *prima facie* case as to the obviousness of any of claims 47, 48, 50-56, or 58-68.

First, it is respectfully submitted that one of ordinary skill in the art would not have been motivated to modify the teachings of Hata in the manner that has been suggested in the outstanding Office Action. In particular, with respect to claims 47, 48, 50-56, and 58-63, it is respectfully submitted that one of ordinary skill in the art would not have been motivated to modify the teachings of Hata in such a way as to develop a conductive trace that is at partially formed on at least one semiconductor device component, as the contact plates 52 and 53 of Hata are not mutually adhered to one another but, rather, biased against one another. With respect to claims 64-68, it is respectfully submitted that one ordinary skill in the art would not have been motivated by the teachings of Hata, which are limited to an electrostatic display element, to come up with an assembly that includes a carrier, at least one semiconductor die, and conductive elements that connect contact pads of the carrier to bond pads of the at least one semiconductor die.

Moreover, it is respectfully submitted that the outstanding Office Action does not provide any reasoning that would support the assertion that one of ordinary skill in the art would have been motivated to have modified the teachings of Hata.

In view of the foregoing, it is not understood how one of ordinary skill in the art would have been motivated to modify the teachings of Hata in the asserted manner, and that one of ordinary skill in the art would not have been so motivated.

Second, it is respectfully submitted that Hata does not teach or suggest each and every element of any of claims 47, 48, 50-56, or 58-68.

Independent claim 47, as proposed to be amended, recites a conductive trace that includes a plurality of superimposed, contiguous, mutually adhered layers, each of which comprises conductive polymer.

The only elements described in Hata that are remotely similar to the conductive trace of amended claim 47 are the central electrode 3 and the assembly of the central electrode with contact plates 52 and 53.

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The central electrode 3 includes a dielectric film 31 sandwiched between two conductive layers 32 and 33. Thus, the two conductive layers 32 and 33 of the central electrode 3 are not contiguous with one another, as required by amended claim 47.

The contact plates 52 and 53 described in Hata are mechanically secured to one another by way of screws 71 and 72 that cause first and second electrodes 1 and 2 to be biased against one another and, thus, to force each of the elements therebetween against one another. Therefore, the contact plates 52 and 53 are not mutually adhered, as required by independent claim 47. Nor, for the same reason, is either contact plate 52, 53 adhered to the adjacent conductive layer 32, 33.

Moreover, it is respectfully submitted that if contact plates 52 and 53 were secured to one another "AS IF" by glue, as asserted in the outstanding Office Action, there would be an intervening layer between contact plate 52 and contact plate 53. As such, contact plate 52 and contact plate 53 would not be contiguous with one another.

It is proposed that claim 49 be canceled without prejudice or disclaimer, rendering the rejection thereof moot.

Claims 48, 50, and 51 are each allowable, among other reasons, as depending from claim 47, which is allowable.

Claim 51 is additionally allowable since Hata neither teaches nor suggests that the central electrode 3 of the electrostatic display device described therein or the assembly of the central electrode 3 with contact plates 52 and 53 is configured to electrically connect two semiconductor device components.

Independent claim 52, as proposed to be amended, recites a semiconductor device that includes a semiconductor device component and at least one conductive trace carried by the semiconductor device component. The at least one conductive trace of amended independent claim 52 includes a plurality of superimposed, contiguous, mutually adhered layers, each of which comprises conductive polymer.

Again, Hata neither teaches nor suggests that the central electrode 3 thereof includes a plurality of layers that comprise conductive material and that are contiguous with one another.

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Rather, conductive layers 32 and 33 are separated from one another by way of a thin dielectric film 31.

Also, Hata does not teach or suggest that the contact plates 52 and 53 that secure the central electrode in place are mutually adhered to one another or to the adjacent conductive layers 32 and 33, respectively, of the central electrode. Instead, contact plates 52 and 53 are held against one another and against the conductive layers 32 and 33 of the central electrode 3 by the forces acting thereon as screws 71 and 72 cause electrodes 1 and 2 to be biased toward one another.

For these reasons, it is respectfully submitted that Hata does not teach or suggest each and every element of amended independent claim 52, as is required to maintain a rejection under 35 U.S.C. § 103(a).

It is proposed that claim 57 be canceled without prejudice or disclaimer, rendering the rejection thereof moot.

Each of claims 53-56 and 58-63 is allowable, among other reasons, as depending from claim 63, which is allowable.

In addition, claim 55 is allowable because Hata neither teaches nor suggests that either the central electrode 3 thereof nor the assembly of the contact plates 52 and 53 and the central electrode is carried by a dielectric layer disposed on an active surface of a semiconductor die.

Claim 60 is further allowable since Hata does not teach or suggest that either the central electrode 3 or the assembly of the contact plates 52 and 53 and the central electrode 3 communicates with a contact of a semiconductor die.

Claim 61 is also allowable since Hata includes no teaching or suggestion that the central electrode 3 or the contact plate 52, 53-central electrode 3 assembly is carried by a packaged semiconductor device.

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Independent claim 64 recites a semiconductor device assembly that includes, among other things, a carrier and at least one semiconductor die adjacent to the carrier. Independent claim 64 also recites that conductive elements connect bond pads of the at least one semiconductor die to corresponding contacts of the carrier.

Hata lacks any teaching or suggestion of an assembly that includes a carrier and a semiconductor die. In addition, Hata does not teach or suggest that any conductive structure thereof would be useful for connecting a bond pad of a semiconductor die to a contact of a carrier.

Moreover, Hata does not teach or suggest that either the central electrode 3 thereof or the assembly of the central electrode 3 with contact plates 52 and 53 forms a conductive element with a plurality of contiguous layers that comprise conductive material and that are mutually adhered to one another. Rather, the conductive layers 32 and 33 of the central electrode 3 are spaced apart from one another by way of a dielectric film 31 and, thus, are not contiguous, while the contact plates 52 and 53 are *plates*, not conductive traces, and are secured to one another and to adjacent conductive layers 32 and 33 of the central electrode by way of compressive forces, not mutual adhesion.

Accordingly, it is respectfully submitted that Hata does not teach or suggest each and every element of independent claim 64 and, therefore, does not render the subject matter recited in independent claim 64 obvious under 35 U.S.C. § 103(a).

Claims 65-68 are each allowable, among other reasons, as depending from claim 64, which is allowable.

In view of the foregoing, it is respectfully submitted that, under 35 U.S.C. § 103(a), each of claims 47, 48, 50-56, and 58-68 is allowable over Hata and, therefore, requested that the section 103(a) rejections of these claims as being rendered obvious by Hata be withdrawn.

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ENTRY OF AMENDMENTS

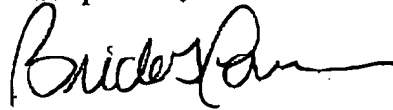
Entry of the claim amendments presented herein is respectfully requested. It is respectfully submitted that the proposed amendments do not introduce new matter into the application. It is also submitted that the proposed amendments would not require a new search, as similar subject matter previously appeared in dependent claims 49 and 57. In addition, entry of the proposed amendments would narrow the issues that remain for an appeal in the above-referenced application. Finally, if it is determined that entry of the proposed amendments would not place the above-referenced application in condition for allowance, entry of these amendments upon filing of a Notice of Appeal in the above-referenced application is respectfully requested.

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CONCLUSION

It is respectfully submitted that each of claims 47, 48, 50-56, 58-68, and 75-90 is allowable. An early notice of the allowability of each of these claims is respectfully solicited, as is an indication that the above-referenced application has been passed for issuance. If any issues preventing the allowance of any of claims 47, 48, 50-56, 58-68, or 75-90 remain which might be resolved by way of a telephone conference, the Office is kindly invited to contact the undersigned attorney.

Respectfully Submitted,



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Date: March 7, 2002

Enclosure: VERSION WITH MARKINGS TO SHOW CHANGES MADE

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

Please amend the claims as follows:

47. (Twice amended) A conductive trace at least partially formed on at least one semiconductor device component, comprising a plurality of superimposed, contiguous, mutually adhered layers, each of said layers comprising conductive [material] polymer.

48. (Twice amended) The conductive trace of claim 47, wherein said conductive [material] polymer comprises a thermoplastic conductive elastomer.

52. (Amended three times) A semiconductor device comprising:
a semiconductor device component; and
at least one conductive trace carried by said semiconductor device component, said at least one conductive trace including a plurality of superimposed, contiguous, mutually adhered layers, each of said layers comprising conductive [material] polymer.

56. (Amended) The semiconductor device of claim 52, wherein said conductive [material] polymer comprises a thermoplastic conductive elastomer.